Journal of the International Association for Mathematical Geology Volume 12, 1980

Editorial Board

Editor-in-Chief: R. B. McCammon (USA)
Deputy Editor: J. E. Robinson (USA)
Book Review Editor: M. David (Canada)

Associate Editors:
R. J. Howarth (UK)
T. Jones (USA)
R. Sinding-Larsen (Norway)

Editorial Correspondents

H. Berner (Sweden)
C. F. Chung (Canada)
A. E. Cockbain (Australia)
I. Dienes (Hungary)
F. Ethridge (USA)
D. Gill (Israel)
W. S. Gruber (Venezuela)
N. Gustavson (Finland)
D. M. Hawkins (South Africa)
K. R. Johnson (Australia)
P. J. Lee (Canada)
P. Leymarie (France)
L. Lindquist (Sweden)
L. I. Malagrida (Spain)
S. Mizutani (Japan)
R. Olea (Chile)
S. V. L. N. Rao (India)
W. Skala (West Germany)
G. Warren (New Zealand)
K. Yamamoto (Japan)

Officers and Council Members of the IAMG

President: D. F. Merriam (USA)
Past President: R. A. Reyment (Sweden)
Vice President: G. W. Hill (Australia)
Secretary General: E. H. T. Whitten (USA)
Treasurers: J. C. Davis (USA)
V. Neměc (Czechoslovakia)
Editor-in-Chief: R. B. McCammon (USA)

Council Members:
F. P. Agterberg (Canada)
K. L. Burns (Australia)
G. de Marsily (France)
D. Gill (Israel)
D. Hawkins (South Africa)
R. J. Howarth (UK)
W. Schwarzacher (UK)

Journal of the International Association for Mathematical Geology is published bimonthly for the International Association for Mathematical Geology by Plenum Publishing Corporation, 227 West 17th Street, New York, N.Y. 10011. In 1980, Volume 12 (6 issues) will be published. Subscription orders should be addressed to the publisher. *Journal of the International Association for Mathematical Geology* is abstracted or indexed in Applied Mechanics Reviews, Chemical Abstracts, Computer and Information Systems Abstracts Journal, Current Contents, Geocom Bulletin, Geotitles Weekly, Mathematical Reviews, Petroleum Abstracts, Referativnyi Zhurnal, Science Citation Index, and Zentralblatt für Mathematik.

© 1980 Plenum Publishing Corporation. *Journal of the International Association for Mathematical Geology* participates in the program of Copyright Clearance Center, Inc. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the stated per-copy fee through the Copyright Clearance Center, Inc. for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. It does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts.

Subscription rates:
Volume 12, 1980 (6 issues) $98.00 (outside the U.S., $111.00). A special price is available to members of the Association.
Volume 13, 1981 (6 issues) $120.00 (outside the U.S., $135.00). A special price is available to members of the Association.

Second-class postage paid at New York, N.Y., and at additional mailing offices.

Printed in USA.

Journal of the International Association for Mathematical Geology is published bimonthly for the International Association for Mathematical Geology by Plenum Publishing Corporation, 227 West 17th Street, New York, N.Y. 10011. In 1980, Volume 12 (6 issues) will be published. Subscription orders should be addressed to the publisher. *Journal of the International Association for Mathematical Geology* is abstracted or indexed in Applied Mechanics Reviews, Chemical Abstracts, Computer and Information Systems Abstracts Journal, Current Contents, Geocom Bulletin, Geotitles Weekly, Mathematical Reviews, Petroleum Abstracts, Referativnyi Zhurnal, Science Citation Index, and Zentralblatt für Mathematik.
© 1980 Plenum Publishing Corporation. *Journal of the International Association for Mathematical Geology* participates in the program of Copyright Clearance Center, Inc. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the stated per-copy fee through the Copyright Clearance Center, Inc. for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. It does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts.

Journal of the International Association for Mathematical Geology

Volume 12, Number 1, February 1980

Contents

Granitic Rocks of Yosemite Valley and an Ideal Granite Model 1
A. B. Vistelius (USSR) and J. W. Harbaugh (USA)

The Random Coin Method: Solution of the Problem of the Simulation of a Random Function in the Plane 25
M. A. Sironvalle (Chile)

Progressively Censored Sampling of Rock Joint Traces 33
G. B. Baecher (USA)

Dynamical Systems and Models for Reversals of the Earth's Magnetic Field 41
D. R. J. Chillingworth (UK) and P. J. Holmes (USA)

An Algorithm for Finding the Position of a Point Relative to a Fixed Polygonal Boundary 61
M. W. D. Davis (Canada) and M. David (Canada)

Typological Factor Analysis: A New Classification Method Applied to Geology 69
M. Dumitriu (Canada), C. Dumitriu (Canada), and M. David (Canada)

SHORT NOTE

Demodulation of Channel Morphological Series 79
D. E. Alexander (UK)

Journal of the International Association for Mathematical Geology

Volume 12, Number 2, April 1980

Contents

Fractals and the Accuracy of Geographical Measures 85
M. F. Goodchild (Canada)

A Statistical Analysis of Exploration Geochemical Data for Uranium 99
D. D. Sarma (India) and G. S. Koch, Jr. (USA)

Robust Estimation of the Variogram: I 115
N. Cressie (Australia) and D. M. Hawkins (South Africa)

Estimating an Upper Bound to Particle Size in Sediment Populations 127
W. E. Bardsley (New Zealand)

Fourier Packing Ordinate: A Univariate Size-Independent Measurement of the Polygonal Packing Variation in Paleozoic Bryozoans 139
R. L. Anstey (USA) and J. F. Pachut (USA)

SHORT NOTES

On the Asymptotic Sampling Distribution of Sediment Weight Fractions 157
W. E. Bardsley (New Zealand)

An Algebraic Method for Evaluating Angular Strain Rosettes 165
D. M. Ragan (USA)

Journal of the International Association for Mathematical Geology

Volume 12, Number 3, June 1980

Contents

On the Least-Squares Fit of Small and Great Circles to Spherically Projected Orientation Data 173
N. H. Gray (USA), P. A. Geiser (USA), and J. R. Geiser (USA)

The Relationship Between Formation Structure and Thickness in the Permo-Triassic Succession of the Southern Coalfield, Sydney Basin, New South Wales, Australia 185
B. L. Jakeman (Australia)

Models for the Study of Stratigraphic Correlation 213
W. Schwarzacher (Northern Ireland)

Asymmetric Measures of Association, Closed Data, and Multivariate Analysis 235
M. E. Hohn (USA) and E. B. Nuhfer (USA)

Estimates of Parameters of Grain-Size Distribution from Weight Frequencies 247
A. K. Adhikari (India), J. Roy (India), and S. Sengupta (India)

Polysynthetic Feldspar Twin-Width Distributions: Models for Inversion Twinning 267
N. H. Gray (USA) and J. B. Anderson (USA)

REVIEW 279

Journal of the International Association for Mathematical Geology

Volume 12, Number 4, August 1980

Contents

Symposia S.12.2.4 and S.12.3.2 of the 26th International Geological Congress, held in Paris, France, July 1980

Introduction to Special Issue on Advances in Mathematical Geology 283

The Lognormal Approach to Predicting Local Distributions of Selective Mining Unit Grades 285
A. G. Journel (USA)

Disjunctive Kriging: Comparison of Theory with Actual Results 305
J.-M. Rendu (USA)

Statistical and Geostatistical Methods Applied to the Exploration Work of the Nanisivik Zn–Pb Mine, Baffin Island, Canada 321
F. - W. Wellmer (West Germany) and G. H. Giroux (Canada)

Statistical Map Analysis Techniques Applied to Regional Distribution of Uranium in Stream Sediment Samples from the Southeastern United States for the National Uranium Resource Evaluation Program 339
R. J. Howarth (UK), G. S. Koch, Jr. (USA), C. Y. Chork (UK), R. H. Carpenter (USA), and J. H. Schuenemeyer (USA)

Extensions of Linear Discriminant Analysis for Statistical Classification of Remotely Sensed Satellite Imagery 367
P. Switzer (USA)

A New Look in Exploration and Development of Old Producing Properties 377
L. B. Lipson (USA)

A Stochastic Model for Strike-Slip Faulting 399
G. Ranalli (Canada)

Journal of the International Association for Mathematical Geology

Volume 12, No. 5, October 1980

Contents

Introduction to the Special Issue on Statistics and the Earth Sciences 415
R. B. McCammon

Some Challenging Applications of Statistical Methods in the Earth Sciences 417
P. Switzer (USA)

Statistics and Earth Sciences—A Challenge for the 80s: The Geologist's Viewpoint 425
R. B. McCammon (USA)

Comment 435
F. Anscombe (USA)

Comment 437
R. F. Link (USA)

Comment 439
G. S. Watson (USA)

Comment 441
L. A. Aroian (USA)

The Statistical Appraisal of Survey Effectiveness in Regional Geochemical Surveys for Canada's Uranium Reconnaissance Program 443
R. G. Garrett (Canada) and T. I. Goss (Canada)

A Three-Dimensional Model to Predict Future Oil Discoveries in Spatially Connected Multiple Plays 459
J. H. Schuenemeyer (USA), L. J. Drew (USA), and W. J. Bawiec (USA)

Regression Models for Estimating Mineral Resources from Geological Map Data 473
C. F. Chung (Canada) and F. P. Agterberg (Canada)

Resource Estimation from Historical Data: Mercury, a Test Case 489
S. M. Cargill (USA), D. H. Root (USA), and E. H. Bailey (USA)

Journal of the International Association for Mathematical Geology

Volume 12, Number 6, December 1980

Contents

Scaling Variables and Interpretation of Eigenvalues in Principal Component Analysis of Geologic Data 523
A. T. Miesch (USA)

Application of Discriminant Analysis and Generalized Distance Measures to Uranium Exploration 539
J. J. Beauchamp (USA), C. L. Begovich (USA), V. E. Kane (USA), and D. A. Wolf (USA)

Estimation of a Surface with Known Discontinuities for Automatic Contouring Purposes 559
J. Pouzet (France)

Exact Formulas for Approximating Variogram Function Integrals 577
M. R. Dunn (USA), H. D. Tolley (USA), and J. R. Alldredge (USA)

Visual Classification of Very Fine-Grained Sediments: Evaluation Through Univariate and Multivariate Statistics 589
M. E. Hohn (USA), E. B. Nuhfer (USA), R. J. Vinopal (USA), and D. S. Klanderman (USA)

Numerical Classification by Association Analysis of Multivariate Mineralogic, Petrographic, Presence-Absence Data from Some Sub-Himalayan Carbonates; Northwest India 607
C. Gundu Rao (India)

SHORT NOTE

James Clerk Maxwell, The First Quantitative Geomorphologist? 615
A. E. Cockbain (Australia)

REVIEWS 617

AUTHOR INDEX TO VOLUME 12 621

SUBJECT INDEX TO VOLUME 12 623